

Ultra-low Cost, Lightweight, Molded, Chalcogenide Glass-Silicon Oxycarbide Composite Mirror Components, Phase I

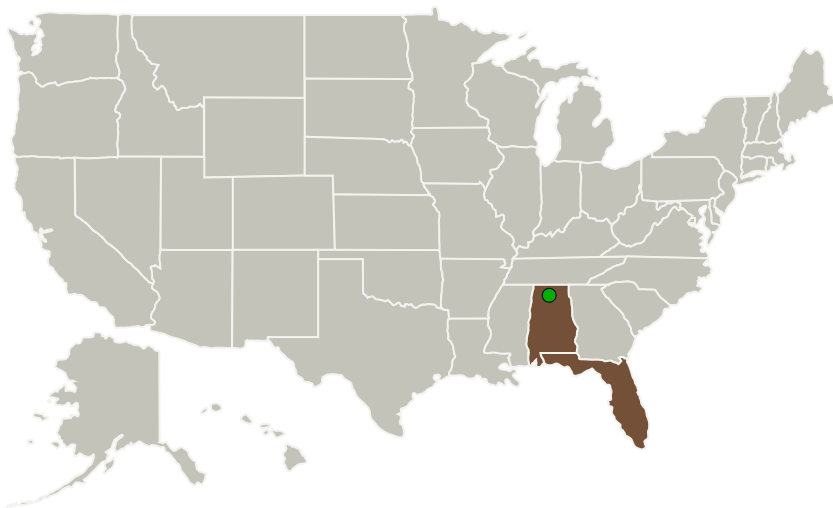
Completed Technology Project (2015 - 2015)



Project Introduction

After optical performance, the most important metric for advanced optical systems is the areal cost (cost per square meter of collecting aperture). Future NASA space mirror requirements call for an order of magnitude improvement in areal cost over current technologies. With this goal in mind, Semplastics will leverage existing in-house technologies to develop an ultra-low cost, lightweight, molded, chalcogenide glass-silicon oxycarbide (SiOC) composite mirror component. This novel silicon oxycarbide substrate has the advantage of using an extremely low-energy process to produce a molded bulk ceramic substrate with weight-reducing rib patterns on the back of the substrate. This silicon oxycarbide ceramic is much lighter in weight than bulk ceramics like silicon carbide or lithium aluminosilicate glass ceramics such as Zerodur™, resulting in an additional benefit in the potential for reduction of on-orbit mass for space missions using this technology. Chalcogenide (ChG) Glass is used to fill in the pores of the porous bulk and support transitioning to a smooth, thermally matched surface ready for aluminization for mirror formation. Successful completion of this development effort will meet both the cost and optical performance targets for next-generation Ultraviolet/Optical and Infrared mirror components.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Semplastics EHC, LLC	Lead Organization	Industry	Oviedo, Florida
● Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Florida

Project Transitions

**June 2015:** Project Start**December 2015:** Closed out

Closeout Summary: Ultra-low Cost, Lightweight, Molded, Chalcogenide Glass-Silicon Oxycarbide Composite Mirror Components, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image(<https://techport.nasa.gov/file/140117>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Semplastics EHC, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

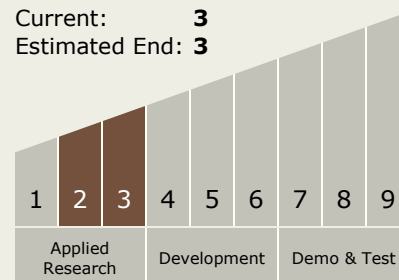
Carlos Torrez

Principal Investigator:

William Easter

Technology Maturity (TRL)

Start: 2
Current: 3
Estimated End: 3



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Images



Briefing Chart Image

Ultra-low Cost, Lightweight,
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Components, Phase I
(<https://techport.nasa.gov/image/135664>)

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon,
Mars, Others Inside the Solar
System, Outside the Solar
System